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219,669 COMPLETE SPECIFICATION 1 SHEET

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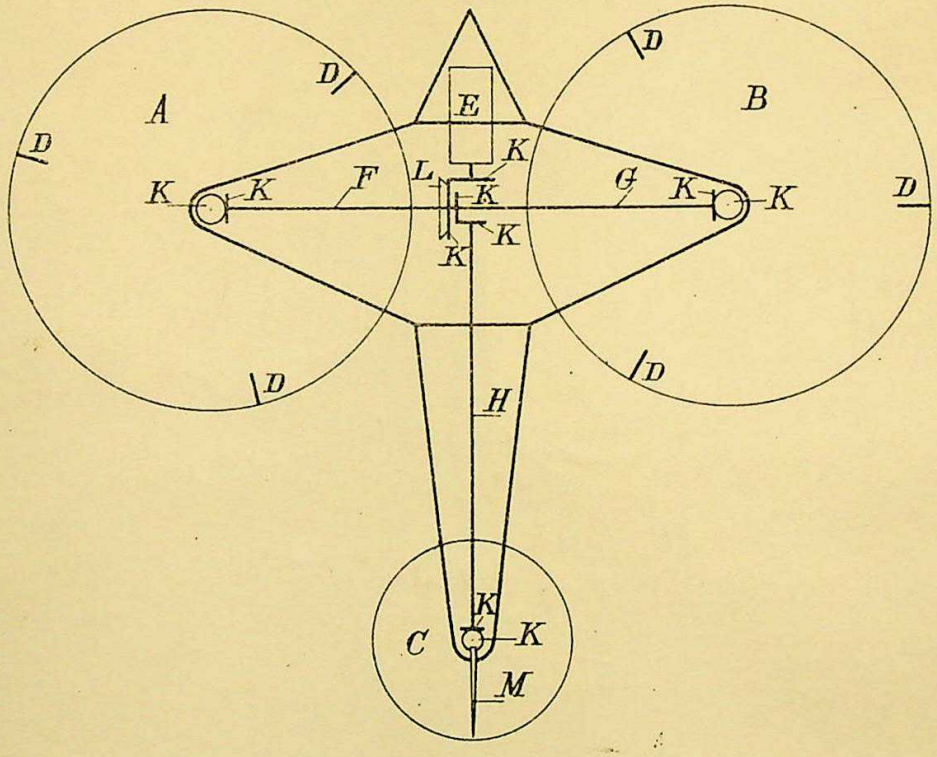

If engine stops, throw out of gear, blade given a negative pitch + thrust descends.

Charles & Read Ltd. Photo Litho.

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Nov 22

Expired

NOTE.—*The application for a Patent has become void.*
This print shows the Specification as it became open to public inspection.

PATENT SPECIFICATION

219,669

Convention Date (France): July 26, 1923.

Application Date (in United Kingdom): July 2, 1924. No. 15,952/24

Complete not Accepted.

COMPLETE SPECIFICATION.

Helicopter.

I, LOUIS LACOIN, of No. 8, rue François Millet, Paris, France, of French nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a method of constructing helicopters in which all the horizontal planes, wings and horizontal tail of an aeroplane, would be replaced by helices so as to reduce to a minimum the resistance to vertical ascent.

The accompanying drawing illustrates by way of example one particular form of construction according to the present invention.

In this example, the apparatus has 4 helices.

Each helix is formed of a certain number of blades the axes of which radiate from that of the helix.

Each blade at the will of the pilot, can be turned around its own axis from a certain positive maximum to a certain negative minimum. All the blades of the same helix turn at the same time, and by the same amount and so vary the pitch of this helix. Any other arrangement of helices with variable pitch may be used.

These helices must be capable of revolving at high speed so that their kinetic energy may, to a certain extent and during some moments, make up for the slowing down or stopping of the engine. If the engine stops at a certain altitude, it is thrown out of gear by means of the clutch L and the blades are given a negative slope so as to maintain their speed and to retard the descent as much as possible. When near the ground the pilot restores the positive slope and lands by replacing the energy of the engine by that of the wings.

Each blade is constructed with the desired resistance, and moreover, it is attached to the axle of the helix either by its own axle, which resists the pull due to the great centrifugal force developed, or by one or several cables or rigid ties.

Of the four helices, two, A and B, replace the two wings of an aeroplane. Their duty is chiefly that of carrying. They turn in a reverse direction to each other so that their two couples of rotation oppose each other. The two couples may be different because the pilot can give to one of the helices a greater pitch than to the other at any given moment.

These two helices are slightly inclined one to the other forming between them a dihedral angle intended to ensure the automatic transverse stability as is the case in many aeroplanes. It is a transverse V according to the adopted expression.

The controlled lateral stability is obtained by the fact, noted above, that the pilot can give more slope to the blades of one of the helices A and B than to the other. To do this he has only to move the control column to the side he wishes to lower or which he wishes to prevent rising.

The other two helices C serve both as horizontal tail and depth rudder. They may be placed side by side, but it is preferable to superpose them which facilitates their being driven by means of the shaft A and the control of the variation of

[*Price* 1/-]

slope of their blades. These two helices have always the same pitch as each other. They form with the central plane of the helices A and B a dihedral angle or longitudinal V giving the automatic longitudinal stability. The controlled longitudinal stability is obtained by varying the slope of all their blades. The pilot operates his control column to do this and moves it forward if he wishes, for example, to urge forward.

This same manœuvre, assisted by increasing the slope of the blades A and B at the same time, if desired, or by accelerating the engine, causes the forward displacement of the machine, all the axes of the helices sloping towards the front.

In order to obtain the stability of route, the pilot uses a vertical plane M which may be placed in the required position and then serve as a vertical regulating tail. It may also, at need, serve as direction rudder.

Further, the helices A and B are provided with small auxiliary surfaces B ordinarily lying flat, for instance like the ailerons of aeroplanes, but which the pilot can raise at will so that they are more or less at right angles to the direction of the current of air. They increase in this way the resisting couple of a helix and enable either the establishing of the equilibrium of the couples of the four helices, or the turning of the helicopter about itself in flight but principally about a fixed point, which cannot be done by the vertical plane M.

The details of construction may vary; however, in the present example the following arrangements have been adopted.

The beam which joins the helices A and B is a rigid block carrying the shaft F G, the engine, and at need the pilot. Above is a cabin, not shown, to which are attached the cross members which maintain at fixed distances the tops of the axles of the helices A and B. A nose is attached to the front of the machine, which acts as a wind screen and which may contain part of the engine and support the radiators.

In the back part may be attached seat where the pilot or the passen can sit and which carries the helices C.

The reservoirs are placed as near possible to the vertical through the po where the shafts F, G and H meet.

The engine E transmits the motive force to the helices by means of intermediate bevel gears K of any suitable shape and a gradual acting clutch L which disengages at will the engine from the whole of the mechanism. The shafts in one or several parts F, G, H drive respectively the helices A, B, C.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A helicopter comprising two helices or groups of lateral helices, forming between them a lateral V and a group of two parallel helices equal in size to each other, superposed on each other or in the same plane and forming a longitudinal V with the central plane of the lateral helices.

2. A helicopter, as claimed in Claim 1, comprising ailerons fixed to the lateral helices the slope of which ailerons is preferably capable of adjustment so that their resisting couple may be varied.

3. A helicopter, as claimed in Claim 1 or 2, provided with a direction rudder which is also capable of giving stability of route.

4. The improved helicopter, substantially as described with reference to the accompanying drawings.

Dated this 28th day of June, 1924.

MARKS & CLERK.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1926.